

Molecular Mechanism of Gentamicin Resistance among Enterococci Isolated from Humans, Food Animals, Meat and Poultry

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In this study we evaluated 140 enterococci with gentamicin MIC's $\geq 256\mu\text{g/ml}$ by Pulsed-Field Gel Electrophoresis (PFGE) and by Polymerase Chain Reaction (PCR) to determine gentamicin resistance genes in these isolates. Samples were collected between 1994 and 2000 from 4 U.S. states including: 18 *E. faecalis* (E.fs) and 10 *E. faecium* (E.fm) from human stools; 56 animal isolates including 11 E.fs, 9 E.fm, 4 *E. casseliflavus* (E.ca) and 1 *E. gallinarum* (E.ga) from turkeys, 24 E.fs and 6 E.fm from dairy cattle and 1 E.fs from swine; and 56 food isolates including 37 E.fs from pork and 11 E.fs, 7 E.fm and 1 E.ca from chickens. Of 101 E.fs isolates, there were 51 E.fs PFGE types with one E.fs PFGE type common in 17 pork isolates and 1 human isolate. Of 32 E.fm, there were 26 E.fm PFGE types with no common PFGE types in human, animal or food isolates. We identified the *aac(6')-Ie-aph(2'')-Ia* gene in E.fm, E.fs, E.ga and E.ca including 96% of human, 80% of turkey, 50% of dairy cattle, 89% of pork and 68% of chicken isolates. The E.fs PFGE type common in the human and pork isolates contained the *aac(6')-Ie-aph(2'')-Ia* gene. The *aph(2'')-Id* gene was in E.fm including 4% of human, 16% of turkey and 32% of chicken isolates. The *aph(2'')-Ic* gene was found in E.fm, E.fs and E.ca including 4% of turkey, 50% of dairy, and 8% of pork isolates and one swine isolate. The *aph(2'')-Ib* was not detected. One E.fm isolate from pork failed to generate a PCR product for any of the genes tested and may contain a new unidentified gentamicin resistance gene. These data, while indicating much diversity among gentamicin resistant enterococci, suggest an association between some gentamicin resistant enterococci in animals, food and humans.

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